

REMARKS

Claims 1-17 remain pending in the above-identified application. Claims 1, 3, 6-8, and 12-14 have been amended herein.

Applicant encloses a credit card payment form to cover a one-month extension fee for this response. The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to Deposit Account No. 19-3140.

In this amendment, references to the specification are made with respect to the clean substitute specification, references to the previous Office Action refer to the Office Action dated December 8, 2005, and references to the previous amendment refer to the amendment dated February 8, 2006.

Objection to Amendment

Applicant requests withdrawal of the objection to the amendments made in the Amendment of September 14, 2005. The matter that the Office Action objects to in claims 1, 3, 7, 8, and 13 has been removed from the claims.

Section 112

Written Description

Applicant requests reconsideration of the rejection of claims 1-5, 7-15, and 17 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The matter that the Office Action cites in the rejection has been removed from the claims. Accordingly, the rejection is overcome and Applicant requests the rejection be withdrawn.

Enablement

Applicant requests reconsideration of the rejection of claims 1-5, 7-15, and 17 under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In the first two paragraphs of the rejection (on page 4 and 5), the Office Action refers to the

relationship recited in claims 1, 7, and 8 between the image data and the light. The features related to that relationship have been removed from the claims.

On page 5, the Office Action seeks clarification regarding the claimed Fourier transformation elements (e.g., the Fourier transformation section of claim 1 and the Fourier transformation of claims 7 and 8). As stated in the previous amendment, the specification describes that the Fourier transformation is performed on a function $a(x)$: $A(X) = H(X) \exp[i\varphi(X)]$, wherein $a(x)$ is an amplitude of the wavefront generated by the GLV in an x direction and each ribbon of the GLV is driven so that a phase difference corresponding to a phase component $\varphi(X)$ is given to the reflected light. See page 10, lines 19-28, of the specification. Further, in lines 8-13 of page 23, the specification describes that a Fourier transformation section "receives image display data from an external apparatus...and performs the Fourier transformation processing of the display image data." Also, in lines 15-22 of page 23, the specification describes that the GLV is controlled "in accordance with the data input from the Fourier transformation section". In addition, Applicant is not clear why the Examiner asserts that one skilled in the art would not understand how the Fourier transformation works while stating that "it is very well known in the art to apply Fourier transformation on image data in the process of processing the image data." See page 9, lines 14-18, of the Office Action.

Because the specification describes the claimed subject matter in such a way as to enable one skilled in the art, the rejection is improper. Accordingly, Applicant respectfully requests the rejection be withdrawn.

Objections to Claims

Applicant respectfully requests withdrawal of the objection to the claims. In the objection, the Office Action refers to the relationship recited in claims 1, 7, and 8 between the image data and the light (page 6, lines 1-5, page 7, lines 1-5 and 12-15). As stated above, the matter regarding this relationship has been removed from the claims. In lines 13-16 of page 6, the Office Action questions use of the phrase "during operation of the device". This phrase has been removed from the claims. In lines 6-11

of page 7, the Office Action refers to the recitation of modulating light in a first direction. The referenced matter has been removed from claims 7 and 8.

It appears that the Office Action restates many objections from the previous Office Action without considering the explanations Applicant provided in the previous amendment. Nonetheless, Applicant addresses each objection below, including providing additional clarifying information.

In the objection, the Office Action also seeks clarification regarding the claimed Fourier transformation (page 6, lines 5-7, 9, and 10). In response to the same inquiry in the previous Office Action, the previous amendment described that the spatial modulator driving section of the controller controls the independent driving of the modulator elements in accord with the transformed data and that the transformation is performed on the image data to determine the relative amounts the modulator elements should be ascended/descended to produce desired display characteristics. *See e.g.*, specification, page 10, lines 6-28.

On page 6, lines 7-9, the Examiner requests clarification regarding the spatial modulator. The spatial modulator section or GLV driving section 43 is a component of the controller that sends signals to the spatial modulator or GLV to control elements of the spatial modulator or GLV. *See e.g.*, Applicant's specification, page 22, lines 16-26, page 23, lines 15-22, and claim 5. The specification further describes that the spatial modulator modulates light to be projected and that one type of spatial modulator is a micro-machine type diffraction grating, called a grating light valve (GLV). *See e.g.*, Applicant's specification, page 8, lines 22-28. Applicant remains unclear as to why the Examiner continues to assert confusion regarding how the controller could accept image data and thereby drive the elements of the GLV while citing a reference (Bloom) that discloses a control circuitry 440 that accepts video data and is coupled to the GLV 402 for using the video data to operate the GLV elements 200 for modulating light diffracted therefrom and while citing a reference (Kajiki) that discloses modulating light based on stereoscopic video image data received by way of a transmission line. *See Bloom*, column 10, lines 43-47, and *Kajiki*, column 11, lines 12-15.

The Examiner also requests clarification regarding the modulation elements and how they relate to the modulator (page 6, lines 8 and 9). The previous amendment described that the modulation elements or ribbons, such as items 11 in Figs. 1 and 2 and items 32a, 32b, and 32c in Fig. 4, are distributed across the surface of the spatial modulator (e.g., GLV 10 or 32) and independently ascend and descend to modulate or alter the relative spacing of the light diffracted from the spatial modulator, citing Figs. 1 and 2 and page 10, lines 6-17, and page 11, lines 9-13. The specification further describes that the spatial modulator includes a substrate and the modulation elements are components of the spatial modulator formed on the substrate and used for selectively modulating the light. *See e.g.*, Applicant's specification, page 9, first paragraph, page 10, first full paragraph, and the paragraph beginning on line 17 of page 16. Applicant respectfully requests the Examiner consider the Applicant's explanation this time regarding the modulation elements.

In lines 10-12, the Office Action states that the apparatus, without the controller, only discloses, scanning light. As stated in the previous amendment, Applicant is not clear why the Examiner is analyzing what the claim would disclose if parts of the claim were removed. Because elements of the controller are recited and related to other apparatus elements, the controller elements must be considered.

The Office Action requests clarification regarding the term "scan unit axis". The scan unit axes are the axes about which the scanning units (e.g., 34 and 35 in Fig. 4) rotate and that the scanning directions are the directions in which the light travels after being scanned by the scanning units. *See e.g.*, Applicant's specification, page 18, lines 1-8, and Fig. 4. For example, the first scanning unit or galvano mirror 34 can rotate about a z-axis to scan light in a horizontal direction and the second scanning or galvano mirror 35 can rotate about an x-axis to scan light in a vertical direction. *See e.g.*, page 18, lines 1-19, and Fig. 4. Although the present Office Action states that this objection item was presented in the previous Office Action, the present Office Action does not acknowledge the explanation provided in the previous amendment. Applicant respectfully requests the Examiner consider the Applicant's explanation this time regarding the description of the scan unit axis in the specification.

In lines 20-24 of page 6, the Office Action requests clarification regarding the claimed Fourier surface. The Fourier surface is not "any surface ... downstream of the Fourier transformation lens," as stated by the Examiner, because, as recited in the claim and described in the specification, the Fourier transformation surface is part of the Fourier transformation lens and the diffuser panel *is disposed on* (i.e., in contact with) the Fourier surface. See e.g., Applicant's specification page 21, line 14, to page 22, line 8. The present Office Action does not address the relevant remarks made in the previous amendment and repeats the same objection, stating that that the Fourier surface is being considered as "any surface...downstream of the...lens", which is an error. Applicant respectfully requests the Examiner consider the Applicant's explanation this time regarding the description of the Fourier surface in original specification.

In lines 16-19 of page 7, the Office Action objects to use of the phrase "in this order" in claim 9. The cited phrase was removed from claim 9 in the previous amendment. Apparently the objection is a vestige from a previous Office Action.

Regarding claim 14, the Office Action requests clarification about the rotation of the modulator and if that rotation achieves the scanning function recited in claim 8. In response to a similar inquiry in the previous Office Action, the previous amendment explained that the specification describes that the modulation device may perform scanning by rotating on page 26, lines 14-17. Further, claim 14 has been amended herein to clearly recite that both of the spatial modulation and the scanning steps are performed using the modulation device and the scanning step includes rotating the device.

For the reasons described above, Applicant respectfully requests withdrawal of the objection to claims 1-17.

Claims 1 and 5 – 35 U.S.C. § 103

Applicant respectfully requests reconsideration of the rejection of claims 1 and 5 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,215,579 (Bloom) in view of U.S. Patent No. 6,043,652 (Liu). As amended, claims 1 and 5 recite a controller including a clock for generating a reference signal by which the controller

operates, a Fourier transformation section that performs Fourier transformation of image data received from an external source and a spatial modulator driving section connected to the clock and connected to the one-dimensional spatial modulator, wherein the driving section operates at a timing based on the reference signal, and controls the independent driving of modulator elements in accordance with the Fourier transformed data.

Bloom discloses an apparatus and method for modulating light including deforming elongated elements 200 by varying a drive voltage. Liu discloses a method for reconstructing data including Fourier transforming data lines, storing the transformed data lines in memory, and converting the transformed data lines into an appropriate format for display on a monitor. See column 9, lines 41-51. Although Bloom discloses modulating light and Liu discloses Fourier transforming data, the references, individually and in combination, fail to disclose controlling independent driving of modulator elements in accordance with Fourier transformed data. Specifically, Liu discloses storing the transformed data and converting the data to a format for display on a monitor (column 9, lines 41-51) but does not show or suggest using the stored transformed data to control a modulator. Bloom discloses a modulator 402 and controlling the modulator by varying a drive voltage using a control circuitry 440 (column 10, lines 43-47), but fails to show or suggest controlling the drive voltage using Fourier transformed data.

The Office Action (page 18, lines 2-4) asserts that Applicant admitted in the previous amendment that Liu discloses a method including Fourier transforming image data for displaying on a monitor *or a spatial light modulator*. However, Applicant did not state that (see previous amendment, page 16, second paragraph) and Liu does not disclose Fourier transforming image data for displaying an image on a spatial light modulator. Further, even if Liu did disclose Fourier transforming image data for displaying an image on a spatial modulator, which it does not, the reference still would not disclose or suggest an apparatus including a spatial modulator driving section that controls the independent driving of modulator elements in accord with data received from a Fourier transformation section that Fourier transforms image data, as is claimed. The Office Action also appears to assert that Liu inherently discloses controlling a

modulator because Liu discloses displaying Fourier transformed data on a modulator. However, Liu does not disclose displaying Fourier transformed data on a modulator, but rather on a monitor or other display device that humans view. See Liu, column 9, lines 41-51. Further, Liu does not even disclose a spatial light modulator. In addition, as mentioned above, the claims recite a modulator driving section that controls elements of the modulator. The modulator of the present invention modulates light in accord with Fourier transformed data and is not simply for displaying an image, as is the case with the monitor of Liu.

Because Bloom and Liu, individually and in combination, fail to show or suggest every feature of the claims, the rejection is improper. Accordingly, Applicant requests the rejection be withdrawn.

Claims 7, 8, 13, and 14 – 35 U.S.C. § 103

Applicant respectfully requests reconsideration of the rejection of claims 7, 8, 13, and 14 under 35 U.S.C. § 103(a) as being unpatentable over the patent issued to U.S. Patent No. 5,694,235 (Kajiki) in view of Liu. Claim 7 recites an image display apparatus comprising means for radiating coherent light, means for receiving image data from an external source, means for spatially modulating the coherent light, wherein the means for spatially modulating is controlled in part according to Fourier transformation of the image data, and means for scanning the modulated light in a first direction and in a second direction that is orthogonal to the first direction. Claim 8 recites an image display method comprising radiating coherent light, Fourier transforming image data received from an external source, spatially modulating the coherent light in accord with the transformed image data, and scanning the modulated light to a first direction.

Kajiki discloses a 3-D recording/reproducing system including a modulator 19. Liu discloses a method for reconstructing data including Fourier transforming data lines, storing the transformed data lines in memory, and converting the transformed data lines into an appropriate format for display. See column 9, lines 41-51. Although Kajiki discloses modulating light and Liu discloses Fourier transforming data, the

references, individually and in combination, fail to disclose controlling a modulator in accord with Fourier transformed data. Specifically, Liu discloses storing the transformed data and converting the data to a format for display (column 9, lines 41-51), but does not show or suggest using the stored transformed data to control a modulator, as described in further detail above. Kajiki discloses modulating light in response to video image data (column 11, lines 12-15), but fails to show or suggest controlling the drive voltage using Fourier transformed data.

In addition, the Office Action asserts the phrase, "modulating is controlled in part according to a Fourier transformation of image data" is indefinite. However, the claim language is definite, as described above regarding the objection and Section 112 rejection.

Further regarding claim 13, the references, individually and in combination, fail to show or suggest, "spatial modulation...controlled based on an amount of shifting of the scanned light resulting from (the) differing scanning speeds." As with the previous Office Action and despite Applicant's assertion of this lack of showing in the previous amendment, the Office Action fails to address these features. Because the Office Action does not address an entire claim, Applicant is not being given a fair opportunity to reply. Section 706.02(j) of the M.P.E.P. states that "it is important for an examiner to properly communicate the basis for a rejection so that...applicant can be given fair opportunity to reply" and to expedite prosecution of the Application by identifying the relevant issues early.

Further regarding claim 14, the references, individually and in combination, fail to show or suggest the modulation device rotating during performance of the method. The Office Action continues to express confusion as to whether the rotation of the modulator achieves the scanning function despite the explanation in the previous amendment that the modulation device does indeed rotate in the embodiment of claim 14. See previous amendment, page 18, lines 18 and 19. Further, as described above, claim 14 has been amended to more clearly recite that the method includes modulating and scanning using the modulation device and that the scanning step includes rotating the device. The Office Action again asserts it would have been

obvious to rotate the modulator of Kajiki to achieve the scanning function to eliminate the need for scanners. However, it would not have been obvious to rotate the modulator of Kajiki and a *prima facie* case of obviousness has not been made. The first criteria for a *prima facie* case of obviousness is "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." M.P.E.P. § 2143. The only motivation provided in the Office Action is that rotating the modulator would eliminate the need for scanners. However, Kajiki clearly discloses the need for scanners and makes no suggestion of not using them. The MPEP requires the Examiner to carefully guard against the natural tendency to resort to hindsight. See M.P.E.P. § 2142. The references do not show or suggest rotating a modulator as claimed. If it were indeed simpler, cheaper, etc., and obvious to rotate the modulator, the feature would have been taught before the present invention.

Because the Kajiki and Liu, individually and in combination, fail to show or suggest every feature of the claims, the rejection is improper. Accordingly, Applicant requests the rejection be withdrawn.

Claims 1-5, 11, and 12 – 35 U.S.C. § 103

Applicant respectfully requests reconsideration of the rejection of claims 1-5, 11, and 12 under 35 U.S.C. § 103(a) as being unpatentable over Kajiki, in view of Bloom, and further in view of Liu. As amended, claims 1-5, 11, and 12 recite a controller including a clock for generating a reference signal by which the controller operates, a Fourier transformation section that performs Fourier transformation of image data received from an external source and a spatial modulator driving section connected to the clock and connected to the one-dimensional spatial modulator, wherein the driving section operates at a timing based on the reference signal, and controls the independent driving of modulator elements in accordance with the Fourier transformed data.

Kajiki discloses a 3-D recording/reproducing system including a modulator 19. Bloom discloses an apparatus and method for modulating light including deforming

elongated elements 200 by varying a drive voltage. Liu discloses a method for reconstructing data including Fourier transforming data lines, storing the transformed data lines in memory, and converting the transformed data lines into an appropriate format for display. See column 9, lines 41-51. Although Kajiki and Bloom disclose modulating light and Liu discloses Fourier transforming data, the references, individually and in combination, fail to disclose controlling independent driving of modulator elements in accordance with Fourier transformed data. Specifically, Kajiki discloses modulating light in response to video image data (column 11, lines 12-15), but fails to show or suggest controlling the drive voltage using Fourier transformed data. Bloom discloses a modulator 402 and controlling the modulator by varying a drive voltage using a control circuitry 440 (column 10, lines 43-47), but fails to show or suggest controlling the drive voltage using Fourier transformed data. Liu discloses storing the transformed data and converting the data to a format for display (column 9, lines 41-51) but does not show or suggest using the stored transformed data to control a modulator, as described in further detail above.

Because Kajiki, Bloom and Liu, individually and in combination, fail to show or suggest every feature of the claims, the rejection is improper. Accordingly, Applicant requests the rejection be withdrawn.

Claims 9, 10, and 15 – 35 U.S.C. § 103

Applicant respectfully requests reconsideration of the rejection of claims 9, 10, and 15 under 35 U.S.C. § 103(a) as being unpatentable over Kajiki, Bloom, and Liu, and further in view of U.S. Patent No. 5,550,779 (Burr). Because claims 9, 10, and 15 depend from claim 1, the rejection of claims 9, 10, and 15 is improper for the same reasons presented above regarding the rejections of claim 1. Burr does not provide or suggest the previously cited elements. Accordingly, Applicant requests the rejection be withdrawn.

Claim 6 – 35 U.S.C. § 103

Applicant respectfully requests reconsideration of the rejection of claim 6 under 35 U.S.C. § 103(a) as being unpatentable over Kajiki in view of Bloom. Claim 6

discloses, among other things, an image display apparatus including a collimator lens making the light modulated by the Grating Light Valve device into parallel rays, a scan unit scanning the parallel rays coming from the collimator lens, a Fourier transformation lens having a Fourier surface and performing Fourier transformation on the scanned rays, and a diffuser panel disposed on the Fourier surface for diffusing the rays coming from the Fourier lens.

Kajiki discloses a 3-D recording/reproducing system including a modulator 19. Bloom discloses an apparatus and method for modulating light including deforming elongated elements 200 by varying a drive voltage. Kajiki and Bloom, individually and in combination, fail to show or suggest an image display apparatus including a collimator lens making the light modulated by the Grating Light Valve device into parallel rays, a scan unit scanning the parallel rays coming from the collimator lens, a Fourier transformation lens having a Fourier surface and performing Fourier transformation on the scanned rays, and a diffuser panel disposed on the Fourier surface for diffusing the rays coming from the Fourier lens. Particularly, the Office Action asserts that the lens 22 or 14a, 14b of Kajiki collimate light from the modulator. However, as is clear from Figs. 11 and 13, these lenses 22, 14a/14b only collimate light leaving the light source 18 with no intervening structures such as a modulator. Further, the Office Action asserts that the lens 2 of Kajiki Fourier transforms modulated light. However, Kajiki makes no mention or suggestion of a Fourier lens or Fourier transforming light. In addition, the diffusion plate 20 of Kajiki is not *disposed on* a surface of a Fourier transformation lens, as claimed.

Because the references, individually and in combination, fail to show or suggest every feature of the claim, the rejection is improper. Accordingly, Applicant requests the rejection be withdrawn.

Claim 16 – 35 U.S.C. § 103

Applicant respectfully requests reconsideration of the rejection of claim 16 under 35 U.S.C. § 103(a) as being unpatentable over Kajiki and Bloom as applied to claim 6 above, and further in view of Burr. Because claim 16 depends from claim 6, the

rejection of claim 16 is improper for the same reasons presented above regarding the rejection of claim 6. Burr fails to disclose or suggest the previously cited elements. Accordingly, Applicant requests the rejection be withdrawn.

Claim 17 – 35 U.S.C. § 103

Applicant respectfully requests reconsideration of the rejection of claim 17 under 35 U.S.C. § 103(a) as being unpatentable over Kajiki, and Liu as applied to claim 7 above, and further in view of Burr. Because claim 17 depends from claim 7, the rejection of claim 17 is improper for the same reasons presented above regarding the rejection of claim 7. Burr fails to disclose or suggest the previously cited elements. Accordingly, Applicant requests the rejection be withdrawn.

Conclusion

As it is believed that the application is in condition for allowance, a favorable action and a Notice of Allowance are respectfully requested.

If the Examiner desires, Applicant welcomes a telephone interview to expedite prosecution.

Respectfully submitted,

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